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## Disclaimer

Presentation materials are for registered participants of the 66th Conference on Exceptional Children. The information in this presentation is intended to provide general information and the content and information presented may not reflect the opinions and/or beliefs of the NC Department of Public Instruction, Exceptional Children Division. Copyright permissions do not extend beyond the scope of this conference.

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## Session Information

- Facilities
- Parking Lot for Questions
- Survey of UEB Experience
- This session is a follow-up to last year's trainings.

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### Participants will:

- Review basic principles and rules for UEB
- Read sample math, science, and technical materials transcribed using UEB
- Transcribe sample math, science, and technical educational materials using UEB
- Collaborate to develop activities to teach UEB to students on their caseload

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### Participants will:

- Discuss transcription of math, science and technical materials in braille.
- Access and discuss resources for UEB instruction and materials

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### UEB Math/Technical in NC

In September, 2015 a group of stakeholders met to decide whether NC should continue using Nemeth or adopt UEB for math and technical materials.

Through lots of discussion and a structured process, the group adopted UEB.

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## Quick Review

All numbers are upper cell

- No more dropped numbers

#a #b #c #d #e #f #g #h #i #j

There is no more literary code and math code, just UEB.

Spacing in braille should match that in print, whenever possible.

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## Numeric Mode

In UEB, you must switch into “numeric mode” by using a number sign.

Numeric mode ends

- After a space
- After any non-number sign EXCEPT period/dot, comma, or fraction line
- Any capital letter
- Any lowercase letter that cannot be a number

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## Termination of Numeric Mode

Numeric mode is terminated following the forward slash, colon, dash, apostrophe and hyphen

After the above listed symbols, the numeric indicator must be used again.

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## Number Sign Examples

Use at the beginning of number

1 235

#a #bce

Can carry across commas, decimal points,  
and fraction lines

3,000 4.21

#c1jjj #d4ba

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## Number Sign

Does not continue after dashes, colons and  
slashes

919-539-3869 #iai-#eci#chfi

11/8/16 #aa\_/#h\_/af

5:30 pm #e3#cj pm

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## Quick Review

Grade 1 indicator - ;

Comma – dot 2 #1

Decimal – dots 245 #4

Dash – dots 36 -

Slash – dots 456 and 34 \_/

Colon – dots 24 3

Numeric Space – dot 5 "

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## Quick Review

Plus "6  
 Minus "–  
 Multiply "8  
 Multiplication Dot "4  
 Divide "/"  
 Equals "7

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## Quick Review

$1 + 1 = 2$   
 #a "6 #a "7 #b  
 $56 \div 7 = 8.$   
 #ef "/" #g "7 #h4  
 The average winter temperature is  $-32^{\circ}$  C.  
 ,! av]age w9t] temp]ature is -  
 #cb^j ;,c4

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## Quick Review

¢ @c  
 \$ @s  
 % .0  
 Degree  $^{\circ}$  ^j

These symbols are used just like they are in print.

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## Quick Review

	Print Sign	UEB Opening	UEB Closing
parenthesis	( )	"<	">
brackets	[ ]	.<	.>
brace	{ }	_<	_>
angle	< >	@<	@>

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## Ordinal Numbers

Since the number sign puts content into Grade 1 mode, contractions cannot be used in ordinal numbers.

1<sup>st</sup>      2<sup>nd</sup>      3<sup>rd</sup>      4<sup>th</sup>  
 #ast   #bnd   #crd   #dth

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## Roman Numerals

Should be brailled as if they were regular letters using rules for Grade 1 mode.

V, v, X, and x will have Grade 1 indicators, I and i will not.

Read parts I, II, and V.

,rld "ps ,il , ,ii & ; ,v4

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## Time to Practice

Braille items on Quick Review Handout.

This is just a warm up and review of rules from previous trainings.

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## Fractions

Simple Fraction

- A fraction whose numerator and denominator contain only digits, decimal points, commas, or separator space

Mixed Number

- A whole number with a fraction

Linear Fraction

- Fractions written linearly with the slash for the fraction bar

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## Fraction Examples

- Simple Fraction  $\frac{5}{8}$  
- Mixed Number  $2\frac{1}{2}$  
- Linear Fraction  $3/8$  

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## General Fraction Indicators

If the numerator or denominator is not entirely numeric, use the general fraction indicator.

- Open General Fraction Indicator (
- Close General Fraction Indicator )
- General Fraction Line . /

$$y = \frac{x}{2} ; ; y " 7 (x . / \# b) ; ,$$

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## General Fractions

•  $\frac{x}{y}$  

•  $\frac{1}{x}$  

•  $\frac{3}{b}$  

- Helpful hint:  
If a number sign immediately follows the GFI only 1 Grade 1 indicator is needed.

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## Time to Practice

Braille items 1-10.

Helpful hint – You may want to determine what type of fraction each one is before brailleing.

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## What is a “Next Item?”

An entire number, including decimal points, commas, and simple fraction lines.

An entire general fraction

An entire radical expression

An arrow

An arbitrary shape

An expression contained in any grouping indicators.

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## Superscripts and Subscripts

Subscripts and Superscripts only affect the next character or the “next item.”

If no Grade 1 indicator is in effect, one is needed so that the sub- and superscript indicators cannot be misread for “en” and “in.”

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## Superscripts and Subscripts

Superscript 9

30 cm<sup>3</sup> #cj cm; 9#c

x<sup>2y</sup> ; ; x9<#by>

Subscript 5

Na<sub>2</sub>SO<sub>4</sub> , na; 5#b, , so; 5#d

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## Time to Practice

Braille items 11-24

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## Radicals

Open radical

⠠

Close radical

⠨

Square root sign without vinculum

⠠⠠

$$\sqrt{9} = 3$$

$$\sqrt{a^2 + b^2}$$

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## More Radicals

$$\sqrt[3]{8} = 2$$

$$q = \sqrt[3]{x^3 + y^3 + z^3}$$

$$q = \sqrt[3]{x^3 + y^3 + z^3}$$

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## Time to Practice

Braille items 25-34

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## Geometry and Trigonometry

If a function name is followed by a number,  
do not space between function and number.

Sin30     , s9#cj  
3tan45°   #c-tan-#de^j  
4cos5X   #d-;cos#e,x

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## Geometry and Trigonometry

Insert a space if a function name is followed  
by a lower case Latin letter with not indicators  
or brackets.

Log y     #d-;cos#e,x  
sinθ     s9.?  
SecA     ,sec,a  
log(x+y)   log"<x"6y">

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## Math Joke

$\sin(\text{gerine})/\cos(\text{gerine}) = \tan(\text{gerine})$

, s9"<g]9e">\_/-cos"<g]9e"> "7  
tan"<g]9e">

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## Time to Practice

Braille items 35-45

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## Spatial Problems

The layout of calculation should follow print as much as possible.

Numeric indicators should be lined up.

You can use a Numeric Passage Indicator with a Numeric Passage Terminator.

Numeric Passage Indicator    ##

Numeric Passage Terminator    # '

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### Spatial Problems Method One

```

456      #def
+ 34     "6# 34
-----  "333
490      #dij

```

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### Spatial Problems Method Two

```

      # #
456      def
+ 34     "6 34
-----  "33
490      dij

```

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### Spatial Problems Method Three

```

      # #
456      def "6
+ 34      34
-----  "33
490      dij

```

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## Time to Practice

Braille items 46-48

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## Greek Letters

Dots 46 indicate that the next letter is Greek.

If a capital sign is needed, it goes before the Greek indicator.

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## Greek Letters

$\alpha$  .a

$\beta$  .b

$\theta$  .?

$\pi$  .p

$\Sigma$  , .s

Area =  $\pi r^2$

,>ea "7 ; ; .pr9#b

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## Chemistry

$\text{CH}_4 + 2\text{Cl} = \text{CH}_3\text{Cl} + \text{HCl}$   
 ; ; ; , c , h 5 # d " 6 # b , c l " 7  
 , c , h 5 # c , c l " 6 , h , c l ; ,

Ions  $\text{H}^+$ ,  $\text{Cl}^-$  and  $\text{Ca}^{2+}$   
 , ions , h ; 9 " 6 l , c l ; 9 " - &  
 ; ; , c a 9 < # b " 6 >

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## Questions

Do you have any questions or samples you would like to share or troubleshoot with the group?

As you are working on braille, feel free to contact me and ask questions.

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## Contact Information

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